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USSR Report

MACHINE TOOLS AND METALWORKING EQUIPMENT

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INDUSTRY PLANNING AND ECONOMICS

DECREE ON MACHINE TOOL TECHNICAL CERTIFICATION

Moscow SOBRANIYE POSTANOVLENIY PRAVITELSTVA SOYUZA SOVETSKIKH SOTSIALISTICHESKIKH RESPUBLIK in Russian No 3, 1986 pp 203-204

[Decree No 83 (Vol 18, Sec I) of the USSR Council of Ministers "On Improving the Procedure for Developing and Reconciling Technical Documentation When Creating and Setting Up the Production of New (Modernized) Machine-Building Output"]

[Text] The USSR Council of Ministers notes that the practice which has evolved in machine-building branches, of numerous reconciliations of technical documentation by various organizations when creating and setting up the production of new (modernized) output, diverts designers and scientists from performing their immediate duties, prolongs design development and scientific research schedules, and in the final analysis delays resolution of the tasks of accelerating scientific-technical progress.

With a view towards creating the conditions necessary to accelerate the development and and introduction of new (modernized) machine-building output into production, the USSR Council of Ministers decrees that:

1. The USSR State Standards Committee, USSR ministries and departments, and union republic councils of ministers are obligated to take the steps necessary to simplify the procedure for developing technical documentation for new (modernized) machine-building output.

2. The proposed "Procedure for Developing and Reconciling Technical Documentation When Creating and Setting Up the Production of New (Modernized) Machine-Building Output" is to be approved and go into effect as of 1 February 1986.

3. The USSR State Standards Committee is to eliminate from the state standards methods provisions regulating the development and introduction of new equipment prior to 1 March 1986, bearing in mind that they may be included, if necessary, in documents in the form of recommendations.

4. A council of the chief designers of the lead machine-building enterprises is to be formed under the USSR State Standards Committee to deal with improving the procedure for developing and reconciling technical documentation and setting up the production of new (modernized) machine-building output.

5. It be established that questions of the possible use of assembly components and materials are not to be reviewed when developing single-item production output.

When developing series- and mass-produced output, questions of the possible use of assembly components and materials are to be reviewed in accordance with a

list of restrictions on such items and materials approved by the USSR Gosplan and USSR Gossnab, simultaneously with approval of the USSR State Economic and Social Development Five-Year Plan. Assembly components and materials not included in the indicated list are to be used without review when developing products.

The USSR Gosplan and USSR Gossnab are to reduce the number of items on this list as assembly-component items and materials on the list are accumulated.

Orders for materials and assembly components whose use in manufacturing machine-building prototypes without review is permitted are issued for the last three months prior to the start of the planning year in which these prototypes are to be created.

6. Ministries and departments are to establish schedules for introducing a "Unified System of Product and Design Document Designations" and a classification scheme for it as subordinate enterprises and organizations are made ready, this work to be concluded by 1 January 1992.

7. The USSR State Standards Committee and the ministries and departments are to modify the state standards and other documents with the changes following from this decree within six months.

8. The USSR State Standards Committee and the USSR Ministry of Justice, together with the ministries and departments concerned, are to prepare and submit to the USSR Council of Ministers within three months proposals on introducing into the current legislation the changes following from this decree.

N. Ryzhkov, Chairman,
USSR Council of Ministers

M. Smirtyukov, Administrator of Affairs,
USSR Council of Ministers

Moscow, Kremlin, 14 January 1986, No 65.

11052
CSO: 1823/281

MACHINE BUILDING VIEWED AS INDUSTRY REVITALIZATION SOURCE

Moscow PRAVDA in Russian 28 Sep 86 p 1

/Article by O. Mikheyev: "Source of Renewal--Today is Machine Builder's Day"/

/Text/ Machine building has been assigned a special role in speeding up the development of the country. The planned rebuilding surpasses what has been done during the entire history of domestic machine building development.

The Deputy Chairman of the USSR Council of Ministers and Chairman of the Machine Building Buro I. S. Silayev talked to PRAVDA correspondent O. Mikheyev about how this business is developing.

Tasks of enormous importance face the machine building complex. All sectors of the national economy must be provided with modern highly productive equipment, the country's production apparatus must be renovated in the shortest time periods, the productivity and reliability of newly introduced products must be increased no less than 1.5-2-fold, the periods for creating and introducing new equipment must be shortened 3-4-fold, labor expenditures and the materials and power intensity of production must be significantly decreased. There must also be a 1.7-fold increase in production volume growth rates and the product output structure must be fundamentally changed.

The achievement over the next few years of a world standard for our manufactured equipment is becoming a general trend in applying the efforts of scientific and engineering subunits and labor collectives. By the end of the five-year plan, 80-85 percent of production must reach this level, and of that which has been developed--95-100 percent.

I would like to note that the accelerated manufacture of the most advanced types of equipment has been established in the five-year plan. This primarily concerns machine tool building, instrument building, and the electrical engineering industry. The production growth rates in these sectors will be 1.3-1.6-fold above the machine building average. The proportion of advanced and highly productive machine tools in metal-cutting equipment production will almost double to 85 percent. The output of rotary conveyor lines, flexible production systems, computer facilities, systems with numerical control,

microprocessors, personal computers, and reliable electric drives will expand considerably. Shipments of complete technological units, primarily for the oil and gas industry, power, chemistry, metallurgy, and the construction industry will grow 2.5-fold. Production output must be increased here largely without using additional labor resources and the most important construction materials.

We must immediately modernize the potential of the machine building complex itself in order to carry out these tasks. Capital investments in its sectors have been doubled and more than half of the funds have been directed toward retooling enterprises. The replacement of the active part of fixed capital is accelerating. Obsolete projects are now being reviewed. The plan is to expand cooperation with the CEMA member countries within the Total Program for Scientific and Technical Progress up to the Year 2000. Associations and enterprises are switching to two- and three-switch operations in imitation of the Leningrad, Kharkov, and other oblasts.

It is especially important not to permit construction program breakdowns as occurred in the last five-year plan when not one of the machine building enterprises met the plans for construction and modernization and for the introduction of capacities and fixed capital. The managers of sectors, associations and enterprises must pay constant attention to this problem.

The national economy is expecting a sharp increase in the quality and reliability of machines, equipment and instruments from the machine builders. The developers of new equipment now bear full responsibility for meeting the future requirements for this equipment's technical level and quality. It is forbidden to turn over developments below the world level for production. The related sectors--metallurgy, chemistry, petroleum chemistry--must more quickly increase the output of effective construction materials in order to carry out what is planned.

A serious reorganization of sectorial science has started. The structure of scientific research work and priority guidance have been revised. Now 75-80 percent of scientific research institute and planning and design organization employees are working in scientific-production and production associations. Several times more funds than previously have been allotted to strengthening experimental plants, facilities, testing areas and laboratories. At the same time the experience of the Leningrad organizations on motivating the creativity of our engineers should be used to the maximum extent.

The Soviet machine builders have everything that is necessary to carry out the crucial tasks set by the party. The main thing is that we have excellent specialists--scientists, engineers, designers, technologists, workers--experts in their fields. Our people are capable of doing wonders. We need only to organize work skillfully, awaken in each of our workers and economic and conscientious attitude toward work, and more actively give the best example to our young people. They are everywhere, at each enterprise. Two-time Hero of Socialist Labor brigade leader V. Chicherov at the association Leningrad Metal Plant, Hero of Socialist Labor lathe operator Z. Kondrashova at the association Novokramatorsk Machine Building Plant, brigade leader A. Pryakhin at the Ivanovo Machine Tool Building association, delegate to the 27th Party Congress brigade leader P. Kovalev at the association Gomselmash/Gomel Agricultural Machine Building Plant/ and many, many others are toiling splendidly.

Our best scientists and engineers are giving an example of constant creativity. Many of them can be justly proud of their contributions to the acceleration of scientific and technical progress. They include, for example, the chief plan designer at the Ivanovo Machine Tool Building association I. Goncharuk, the chief of the design sector of the NPO/scientific production association/ Atomkotlomash/Nuclear Reactor Machine Building Plant/ V. Chesnokov, the chief of the KB/design buro/ of the Moscow Association for the Manufacture of Automated Lines Z. Babadzhanyan, the engineering technologist of the Kharkov Refrigerating Machine Plant F. Belikov and many others.

At the same time we must frankly recognize that there have not yet been changes for the best on all fronts. A tempo which the five-year plan imparts has not yet been set. The burden of the old plan is still pulling. We must increase our energies, speed up reorganization in the labor collectives, and fully utilize their expanding rights and potential in order to more quickly reach the level of the five-year plan tasks. Then success will come and the confidence of the party will be warranted.

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INCENTIVES FOR LARGE-SCALE AUTOMATION OF MACHINE BUILDING INDUSTRY

Moscow FINANSY SSSR in Russian No 6, Jun 86 pp 36-38

[Article by NIItsen (Scientific Research Institute for Prices) Junior Associate A. S. Rusetskiy: "Methods of Stimulating Comprehensive Machine-Building Production Automation"]

[Text] One of the main directions of scientific-technical progress in machine-building is comprehensive production automation based on the broad introduction of industrial robots (IR), production modules (PM) and flexible manufacturing systems (FMS). Comprehensive automation is considerably superior to a majority of the known methods of intensifying production and needs a flexible, dynamic system of economic stimulation and broader enterprise opportunities for attracting resources to develop flexible manufacturing complexes.

Expenditures on scientific research, restructuring the entire production process, use of new types of materials, training highly skilled personnel to work in robotized sectors -- these are the main problems one encounters when developing and introducing IR and FMS.

It should be noted that a perceptible economic impact can be obtained only by using the whole complex of robot-engineering devices. Implementation of such large-scale measures requires significant capital expenditures and quite naturally raises the question of sources for financing them. The system of financing work to introduce comprehensive automation must ensure the cost-accounting interest of enterprises (associations) in moving as quickly as possible and must be closely linked to the price system, both for the robot equipment itself and for the output produced using IR.

IR and FMS production is being developed in the USSR in accordance with five-year and annual national economic and branch plans, target comprehensive programs and other planning documents. The decisions about the appropriateness of developing and introducing them are based on calculations of the economic impact of using this equipment. The anticipated national economic impact of freeing workers for other jobs when IR are introduced includes better recording of payments from social consumption funds (40 percent of wages), savings in capital investment in housing and cultural construction, a higher technological equipment load factor reflecting better production organization and a reduction in losses of working time.

The best domestic and foreign series-produced models having comparable technological indicators are used as analogs when developing IR. A top price based on direct cost and normative profit is calculated simultaneously with the economic impact in the early design stages. A wholesale price based on planned net cost plus the normative profit set for that planned net cost, minus material expenditures, is set when IR series production is set up. The net cost adopted as the wholesale price base reflects planned expenditures in the first year of series production of the item.

Improvement in the technical level and quality of robot manufacturing output is stimulated by prices in two ways. The first is profitability differentiation for output at different technical levels and of different quality. The profitability for an above-normative level can be purposefully set to stimulate the release of very efficient types of equipment which will save materials and labor. A higher profitability normative of 60 percent of net cost minus material expenditures is set for this equipment, while it varies from 31 to 56 percent of direct outlays for other machine tool manufacturing output.

The second and most widely used method of price stimulation is to set a price surcharge for very efficient output and wholesale price discounts for poor-quality output to be withdrawn from production. The role of surcharges and discounts in stimulating scientific-technical progress will be significantly increased in the 12th Five-Year Plan. Incentive surcharges are set for prices on output equal to the best domestic and foreign analogs in terms of parameters if the ratio of economic impact to wholesale price equals or exceeds 15 percent. The surcharge is generally set at 50 percent of the economic impact, but it can reach 70 percent in individual instances. The surcharge amount must not exceed 30 percent of the wholesale price. This procedure has been established for IR, complete technological lines, installations and devices, as well as for certain other types of machine-building output. Surcharges remain in force for up to two years. If a product has been certified with the Emblem of Quality at the end of that time, the surcharge is extended for the period established for the Emblem of Quality certification, without altering its amount. Wholesale price discounts for output not meeting modern requirements are an important lever for accelerating the pace of updating products lists.

Beginning in 1986, new procedures are in effect for approving discounts. A discount of five percent of the wholesale price is automatically established for output not certified in the highest quality category, and the discount is increased by a like amount with each passing year. If a product is again put in the first quality category when re-certified, it must be withdrawn from production. Production of it may be continued only in exceptional cases approved by the USSR Gosplan and USSR Gossnab, and only with a 30-percent discount.

Up to 70 percent of enterprise revenue shortfalls due to such discounts is reimbursed from the material incentives fund. Up to 20 percent of the planned amount of such funds can be used for these purposes. The consumer enterprise markets the product at wholesale prices without discounts. The amount discounted is transferred to the state budget and is not considered in enterprise profit and marketing plans. Over the five-year plan, the total discounts to be transferred to the budget must (for machine-building as a whole) be double the total surcharges set. Analysis of the substantiation of current surcharges is also planned.

It might be concluded that the price incentives system currently in effect does not encompass the entire process of creating, developing, producing and using flexible systems and their components. The higher profitability and the system of surcharges and discounts concerns primarily enterprises producing robot equipment. The existing price system does not exert the necessary stimulus influence on enterprises consuming this equipment. Price-formation agencies are planning a number of steps to correct this situation and will correct it in the near future, but for now, the leading role in encouraging consumer enterprises belongs to financial levers.

Many normative documents already reflect problems of stimulating scientific-technical progress in branches of the national economy through the financing mechanism. Thus, a portion of the expenses associated with manufacturing IR and additional accessories and with the introduction of FMS can be financed using Unified Scientific and Technical Development Fund monies under the procedure established by the Methods Instructions approved by the State Committee for Science and Technology, the USSR Gosplan, USSR Ministry of Finance and USSR State Price Committee in 1979. If enterprise indicators deteriorate due to mastering the production of flexible manufacturing systems, the economic incentive fund is supplemented by the appropriate ministries using centralized funds. The source of the additional deductions to the material incentive funds of enterprises using IR in production is deductions from the profit generated by the actual reduction in product net cost as a result of using the robots. The amount of the incentive for using robots which significantly reduce production labor intensiveness, foremost in sectors with difficult and hazardous working conditions, is increased using monies from the centralized bonus fund for developing, producing and utilizing new equipment by ministries and departments (by 25 percent)

Comprehensive automation can also be financed through bank loans. It is permissible to begin repaying long-term loans in the second or third year of production of new FMS output. The interest rate for a loan issued for these purposes is determined by the Gosbank and USSR Stroybank. Scheduled interest payments are provided for in financial plans through enterprise (organization) profit. When FMS start-up schedules are shortened, the interest rate may be cut in half.

However, analysis shows that these steps are inadequate and do not encompass the entire range of problems. Thus, the "1982 Methods for Setting Wholesale Prices for New Production-Technical Machinery, Equipment and Devices" state that "the amount of higher expenditures for preparing and setting up production to be reimbursed from YeFRNT [unified scientific and technical development fund] may be stipulated in price lists for all types of new output" (Article 3.3). However, the history of wholesale price approval demonstrates that a number of machine-building enterprises producing IR have had very high initial expenditures, since their facilities are not specialized to produce items of that class and in small lots. It is necessary to make more extensive use of the provisions of Article 3.3 of the Methods when approving prices. In this instance, a flexible combination of wholesale prices and fixed supplemental payments from the YeFRNT would guarantee that the manufacturer would recompense all substantiated expenditures and would guarantee reduced prices per unit of useable end product for the consumer.

Enterprises introducing robot equipment often do not obtain a significant economic impact. Given the relatively high cost of robotization devices, even with the additional payments from material incentives funds and the savings on housing and municipal services construction, this equipment is low-impact (especially in the initial years of operation). It is not currently possible to lower robot prices, since that could lead to their being produced at a loss. It would be appropriate to examine the question of developing a special target fund to cover a portion of the expenses associated with IR and FMS production at the ministry level. The additional profit obtained by consumers introducing such equipment could be the source of these funds.

GDR and Czechoslovak SSR experience in using a dual price structure to stimulate robot equipment production, in which the difference in consumer and producer prices is covered by the budget, merits attention. A planned reduction in subsidies encourages enterprises producing robot equipment to lower manufacturing expenditures. However, a more promising solution is to make up the difference in prices not from unitemized funds, but from a special centralized fund which could be generated using a portion of the discounts from wholesale prices for output whose production is economically appropriate. This fund should be available to agencies directly responsible for technical policy in the field of comprehensive automation.

As equipment becomes increasingly complex, with the extensive use of electronics, the question of changing the procedure for calculating and using the depreciation fund becomes increasingly important. In the developed capitalist states, there has been a steady trend towards reducing depreciation schedules legislatively. The higher rate of depreciation set for enterprises producing IR and FMS is an important factor in increasing economic interest, since the funds directed into depreciation are not taxed.

In the Soviet Union, there is currently a large amount of equipment beyond its service life which should have priority for replacement with efficient, fully-automated equipment. The most complex part of robot equipment complexes and generally the part which malfunctions most often is their control systems, which can only be repaired by specialized enterprises. For the IR customer enterprises, equipment repair is reduced to day-to-day replacement of malfunctioning units with new ones. This increases the proportion of expenditures on renovation as compared with expenditures on major overhaul. An adequate supply of serviceable subassemblies must always be kept in the work area to reduce malfunction-generated losses to a minimum. In this connection, we should already be thinking about significantly reducing expenditures on major overhaul in the branches actively introducing comprehensive automation.

When developing methods instructions for generating major overhaul funds at enterprises, the question of sharply reducing the size of such funds and the appropriateness, in a number of instances, of creating such funds at all, should be examined. Along with this, deductions for full renovation must be considerably increased, so as to increase enterprise interest in using progressive types of equipment. Such measures will not entail increasing production expenditures.

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MOLDAVIA'S CP CC TARGETS MACHINE TOOL TASKS, PROBLEMS

Kishinev SOVETSKAYA MOLDAVIYA in Russian 21 Oct 86 p 2

[Article: "The Main Criterion is the Final Result"]

> [Text] (ATEM)--As was already reported, a conference has taken place in the Central Committee of the Communist Party of Moldavia at which ways of further intensifying machine building were discussed. Secretary of the Central Committee of the Communist party of Moldavia V.F. Semenov presented the paper "Problems for the Collectives of Machine-Building Enterprises, Associations, Scientific-Research and Design Organizations with Regard to Fulfilling the Requirements of the 27th Congress of the CPSU and the goals of the CPSU Central Committee conference (August 1986) on Significantly Increasing the Technical Level, Quality and Competetiveness of Production".

In terms of its scale and complexity, the party's program for reorganizing the national economy and converting it to an intensive development track is unequaled in the history of our government, said the speaker. A key role in the program is assigned to machine building. It is here that the machine and equipment systems that determine progress in other branches of the economy are created. There is virtually as much to be done in one five-year plan as was done before in three or four.

One can already say that things have gotten better in machine building. But, as was noted at the conference in Moscow, we should not flatter ourselves with the results that have been obtained. The reorganization has still not covered the entire field. Many factors continue to impede it, brought about by inertia in thinking, complacency and the deep-rooted tendency to forget about perspective in the everyday bustle.

This is completely relevant to our republic. In the nine months of the current year eight machine building enterprises have not fulfilled the plan for the sale of goods and every third has not completed deliveries according to contract. In comparison with the same period last year, the proportion of goods bearing the state Emblem of Quality has dropped by 10.7 percent. This indicator has declined at every third enterprise, including at Vibropribor, Mikroprovod, Pishchemash, Komplektkholodmash and other plants. According to the data of the last Gosstandart check only six percent of the 166 products that have the Emblem of Quality correspond to the analogous foreign standards.

One cannot avoid linking such a situation with the routine occurrences taking place in the republic in many trends in the development of science and technology and in the organization of production and control and with the extremely inadequate use of the great technological and impressive intellectual potential that has been accumulated in machine building. As a result, in the presence of conditions for significantly more efficient operation many goods are substantially lower than corresponding world indicators in terms of reliability, longevity, technological effictiveness, specific consumption of materials and other parameters. One of the most important reasons for this is the absence among many scientists and specialist-industrial workers of an orientation toward better achievements and an ability to live for tomorrow.

It is necessary to begin an analysis of the new modern thinking with the understanding that all our work in the improvement of machine building production, primarily in the development of new types of machines, equipment and tools, is in need of serious improvement. A great deal of efficiency should be imparted to it as well as a focus on the most competent solution of existing technical problems.

It is completely intolerable that certain design bureaus continue to produce goods whose technological level falls significantly short of modern demands. The T-70S tractor, put out by the Kishinev tractor plant production association, lags behind foreign analogs in terms of many parameters. Last year USSR Gosstandart reversed the decision of a state commission to put the T-70S tractor in the highest category of quality. This is a serious signal for the SKB [Special Design Bureau] collective, for its chief, Yu.G. Urasov, and for the secretary of the party organization, E.I. Dontsov.

Things are organized differently at the Plodselkhozmash production association. Success in the development of modern machines is determined here largely by the activity of the GSKB [Chief Special Design Bureau], whose collective has a good feel for the pulse of the times, works creatively and has a long-term perspective.

Preparation of scientific-technical programs for the renovation of production and output is presently concluding in the branches of the machine building industry. In accordance with them it is necessary to have plans at every enterprise and in scientific organizations to remove from production or modernize every kind of obsolete goods as well as to have times for replacement and for the assimilation and lot production of new, modern equipment. Without this we cannot solve the most important economic and political problem--producing, by the end of the five-year plan, 80-95 percent of the kind of machine building output that would correspond to the world standard.

The most important conditions for technical renovation and increased efficiency of new developments are modern electronics and computer technology and automated production control based on them. The accumulated experience in computer applications allows a move from the solution of separate engineering-production and economic problems to the creation of automated systems for production preparation and for production control at various levels. Automated production control systems are used most effectively at the Tiraspol Casting Machine Plant imeni S.M. Kirov and at Signal in Kishenev. At the majority of enterprises computer complexes are used primarily in an information regime for accounting

and other uncomplicated calculations. At a cost of more than a million rubles the Schetmash association has acquired two computers for the solution of production and technical problems, however, the return from them has been poor.

It is not enough to saturate production with progressive equipment--it must be utilized efficiently, the speaker emphasized. He cited cases of irresponsible attitudes toward the use of expensive, high-productivity equipment. As a result of systematic losses of machine time, the shift factor for equipment has virtually not increased over the last few years.

A substantial increase in the efficiency of its operation can be achieved by changing the machine stock over to operation in two or three shifts. The CPSU Central Committee declaration about the initiative of Leningraders is aimed at this very thing. However, the directors of many associations and enterprises approach the solution of this problem indecisively, not wanting to burden themselves with additional problems, and party gorkoms and raykoms are resigned to a similar attitude toward business.

Calculations showed that switching workers that use low-productivity equipment (about 12,000 people, or approximately a third of those now on the first shift) to a second shift allows the shift factor for equipment to be brought to 1.9-2.0. As a result of this it is possible to free up a large area and provide workable opportunities for the retooling of enterprises. This work is an important element of reorganization, and it must be carried out competently and in an organized manner. It has already been begun, but at many enterprises decisive movement toward increasing the technological level of production has not occurred. For the 11th Five-Year Plan, semi-annual equipment replacement comprised only 1.3 percent. The ageing of basic stocks diverts more and more means to the maintenance of the serviceability of technological equipment.

The structure of the equipment also requires improvement. Among metal-cutting machine tools the proportion of machines for crude machining (lathes, milling machines, planing machines) remains high--40.2 percent of those that provide the basic mass of cuttings. At the same time, the proportion of machines that guarantee high precision of production (grinding and finishing machines) is small--17 percent in all.

This testifies to the absence of a well thought-out approach to the equipping of enterprises and to the implementation of the achievements of scientific-technical progress. Individual enterprises, among them the Beltsy Electrotechnical Plant, spend substantial means on these goals, however, the return is minimal. It is necessary decisively to put an end to such practice.

It would be more purposeful to get involved in the robotization of production. The republic has already accumulated definite experience, for example, in the Volna production organization. However, the specialists and directors of many enterprises still do not understand the necessity of robotizing production. It is also being delayed by a lack of coordination here. With a view to speeding up work in the given direction, at one time the experience accumulated in the Latvian SSR was studied and a scientific-technical conference was held. The secretariat of the Communist Party of Moldavia Central Committee recognized as expedient the creation of a republic interagency center for robot technology

based on the Moldavian SSR Academy of Sciences Institute of Applied Physics. However, up until now this problem has not been finally resolved by Gosplan (assistant chairman L.F. Kulyuk). Clearly the time has come for the departments of the central committee to deal with this.

Together with the utilization of more modern equipment, problems that need to be resolved today are those of wide application of progressive technological processes, structural and other materials, and ways of machining metal, as well as work organization based on flexible automated systems, the use of rotor and rotor-conveyor lines, and a switch to group technologies of parts manufacturing. Activizing operations in this direction requires posing the question now about fundamental improvements in the quality of production--without the corresponding technical base it cannot be achieved.

The resolutions of the CPSU Central Committee and the USSR Council of Ministers give broad scope for the move toward production of new higher-quality goods. The fetters that prevented him from acting efficiently have virtually been removed from the business executive. The material incentive for producing goods that meet the world standard has increased sharply and, on the other hand, economic responsibility for the production of obsolete goods has been strengthened.

The role of the chief designer in this matter has increased. He is the one who is called upon to formulate technical policy at his enterprise, and he bears personal responsibility for the conformity of goods to world requirements.

Sweeping changes are taking place in the mechanism of quality control. The establishment of organs of state acceptance will allow a significant strengthening of control over the level of final results of the machine builders' work. Strict observance of the requirements of technology at every workplace should be secured at all of the republic's machine building enterprises without exception. It is necessary everywhere to cease the practice of deviating from design requirements and from technical conditions. Speaking about the necessity of cutting back waste, the speaker reminded us that deductions for it have been increased by declaration of the USSR Council of Ministers from a third to a full month's salary. The link with the consumer must also be substantially strengthened. His assessment of the quality of goods should be primary.

An important role in the fight for quality belongs to the foreman and the technician. They are the primary observers of the technological order in production and they should present a unified front in the battle for quality of labor and production in unity and mutual understanding. Every instance of ignoring the demands of the foreman or the shop technician for strengthening technological discipline should be considered by the appropriate directors as an extraordinary event, with all the ensuing administrative and other conclusions.

The stated requirements pertain to all the enterprises in the republic, since violations of technological discipline have become widespread occurrences. It is impossible to become reconciled to the fact that, out of 44 machine building enterprises surveyed this year, goods produced at 31 of them deviated from standards and technical conditions. They have become accustomed to a low technical level at the Komplektkholodmash plant in Strasheny (director M.M. Novikov, party organization secretary Ye.G. Kulbikov). The Moldselmash production association in Beltsy has surrendered its position in terms of quality.

Certification in terms of quality categories is an effective lever of active influence on the technical level and quality of output. But it is used extremely inadequately. In the first eight months of the current year at machine building enterprises only 20 percent of the goods that the annual plan had stipulated for certification were actually certified.

The policy of rush work that continues at many enterprises has a negative effect on the quality of production. At the Schetmash and Moldavgidromash production associations and at the Bendery Machine Building Plant 60-100 percent of the monthly plan has to be done in the last ten days of the month.

There are many factors that influence the quality of production. Where problems are solved as a set, the business situation is better. Party gorkoms and raykoms and trade union and komsomol organs must learn to analyze better the work that is being done at enterprises in terms of improving the quality of goods and effectively disseminating the leading experience.

One can judge the technical level of production and the quality of the output of machine building enterprises in the republic by the statistics for their export deliveries. And they are not comforting. In 1985 the proportion of machine building products in the total volume of exports was only 17 percent, the lion's share of it being put out by two enterprises, the Mezon production association and the Elektromashina plant. Such large enterprises as the Schetmash, Kishinev Tractor Plant, Plodselkhozmash, Moldselmash and other production associations virtually take no part in export. Direct contacts with the enterprises of socialist and other countries create good opportunities for entering the international market. A good example of businesslike creative cooperation is the joint operation of many years' standing between the Electromashina plant and a related enterprise in the GDR for the development of modern small-scale washing machines. Such connections must be developed in every possible way.

Another important resource for developing high-efficiency equipment that does not fall short of the best foreign standards is changing the relations between science and industry. Science should become a direct participant and be responsible for every stage in the development of goods right up to the point where they are turned over to the buyer.

The All-Union Scientific-Research Institute for the Development of Non-Destructive Methods and Means for Controlling the Quality of Materials PO [Production Organization] Volna imeni K.U. Chernenko (director V.N. Sosedov, party organization secretary V.S. Gavrev) worthily represents branch science in the republic. In the 11th Five-Year Plan, thanks to the fruitful activity of the institute, the range of products produced in the association was fully renovated. The collectives of the SKB at the Tiraspol association Tochlitmash, Kishinev's Plodselkhozmash and others are solving technical problems on a modern level. However, the activity of a number of branch design, scientific-research and planning organizations does not meet modern requirements. Their work is ineffective, uncreative and not noticeably influential in increasing the technical level of production. In the chief design-technological institute of unitized equipment for animal husbandry and fodder production Komplektzhivmash (director A.V. Makarov, party organization secretary V.P. Skoplev) the plans

contain little of an investigative character, and research themes and forecasting are virtually absent. In recent years the activity of the All-Union Design-Technological Institute NPO [Scientific Production Association] Tekhnologiya (director I.S. Semernikov, party organization secretary V.I. Miroshnik) has repeatedly undergone severe criticism, but the situation there has not changed for the better. The work of a number of other scientific-research institutes is also inefficient. The quality of reconstruction projects and the expansion of a number of enterprises, in particular the refrigerator plants and Elektromashina, have given rise to much unfavorable criticism. Gosstroy must clearly do the appropriate examination of the given projects and determine the advisability of carrying them out.

An experimental plant imeni M.I. Kalinin NPO Tekhnologiya, set up at the beginning of this year on the basis of the VPTI [All-Union Design-Technological Institute], has still not yielded the required increase in efficiency in operation. The Kishinev gorkom and the Lenin raykom of the party do not see this and are not exerting party influence on the improvement of its activity.

In light of present demands, the directors of institutes and design bureaus must concentrate their strength on a systematic scientific analysis of the conformity of all technical and economic indicators of the equipment being developed and produced by them to world achievements, and they must bring to light basic tendencies in the development of technical progress and set specific tasks for their specialists on this basis. Good conditions have now been established in the remuneration of engineering and technical workers, and there are opportunities better to utilize the brigade form of labor and more efficiently to implement profitability ratios.

Time dictates the necessity for radical changes in the character of the very labor of the designer and the constructor and for equipping the NII [Scientific Research Institute] and KB [Design Bureau] with the means for automation. The systems for automated design in the design bureaus of the Moldavgidromash and Kishinev Tractor Plant production associations operate efficiently. They were set up with domestic equipment.

The experience of the tractor designers and SKB-2 in the establishment of automated design systems has been approved by the USSR Ministry of Tractor and Agricultural Machine Building, which adopted a resolution to disseminate this initiative among enterprises in the branch. This must also be done in the republic. Such systems are being implemented slowly in the Schetmash PO, the Tekhnologiya NPO, the Signal, Alfa and Elektromash plants and others.

The production of reliable and durable modern equipment must not be adjusted even at a technically well organized operation if its creators lack the proper experimental and testing foundation. This problem remains urgent. At the present time only nine out of 18 scientific-research institutes and design bureaus under union authority have it. In many ways this is a result of inadequate persistence on the part of enterprise directors in posing questions in the corresponding ministries.

Party gorkoms and raykoms need to strengthen party influence on the entire course of scientific and technical progress, devote more attention to work in the

collectives of scientific-research and design-constructor organizations and scientific-technical societies, more boldly break down the outdated conceptions of business executives, and channel their activity toward reorganization.

After the CPSU Central Committee conference that took place in June of last year on problems of accelerating scientific-technical progress in our republic, a more active search began for ways of using Academy of Sciences facilities for the stated goals, their links with industry began to be strengthened, and interesting suggestions were worked out and are being studied. The suggestion made by the Moldavian SSR Academy of Sciences Institute of Applied Physics about establishing an inter-agency scientific-technical complex, Mikrooptoelektronika and automated systems, should be attributed to them. It is made up of two scientific-technical centers. The supposed active participation of machine building enterprises, institutes and design bureaus under union authority in them is highly valuable.

This is a new progressive form of uniting the interests of basic and applied science with industry. The expedited examination of this problem depends on the republic council of ministers.

The speaker also said that the problem of training cadres for machine building is important in technical reorganization. A substantial gap has been generated in the republic between established industrial potential and the development of a base for professional-technical training and higher education. In many plans for the construction of new machine building plants the necessary means for training cadres are not provided for. In the majority of cases the plan at such enterprises is to hire up to 80 percent of the work force "on the side". The republic Gosplan, jointly with union ministries, must examine these problems and correct the situation. It is time for enterprise directors to realize that we cannot get by without PTU [Professional-Technical Training Schools] today. At every plant and in every association there should be a clear program of training and retraining cadres, and it should be coordinated with long-term tasks.

The work with young specialists demands serious improvement. In the course of the last five-year plan the republic's enterprises received more than 2000 of them, but a third of those were fired, many because there was no housing. As with young specialists, housing benefits are not offered to those workers that finished the correspondence or evening divisions of vuzes. It appears that this is wrong. No doubt the appropriate organs of the council of ministers and the council of professional unions should study this question and find a correct solution in the interests of the state.

For appointing specialists, the policy of providing young people from among the best workers with stipends for studies in the republic's vuzes and technical schools is underused. Thus, at the Kishinev Polytechnical Institute imeni S. Lazo there are only 24 scholarship students from machine building enterprises out of almost 7000 students in the day division.

In this and the next five-year plans the number of those working at the republic's machine building enterprises will double. A sharp increase is contemplated in the demand for specialists with higher education, especially in such progressive technical fields as electronics and programming. The plan for this five-year plan

and the projection for up to 1995 show that the primary source of specialists for future and currently operational enterprises remains students of the country's other vuzes that are directed to our republic.

And what about our own base? Expansion of our only technical vuz, the Kishinev Polytechnical Institute, has been going on for many years and many machine building enterprises participate either little or not at all in its development.

The 27th CPSU Congress put forth a demand--decisively to set limits in the independence of labor collectives and to raise their responsibility for the achievement of the highest end results. In developing the aims of the congress the CPSU Central Committee and the USSR Council of Ministers adopted a number of resolutions for improving the economic mechanism. New management conditions call for measures that create real opportunities for labor collectives to carry out continuous technical improvement of production and modernization of output. Particular attention is given to the utilization of an enterprise's own means and bank credit.

A task of particular importance is the preparation of Minkhimmash and Minpribor enterprises located in the republic for operation, starting 1 Jan 87, according to the experience of the Sumy Production Association imeni M.V. Frunze and based on the principles of self-support and self-financing.

Today, when large-scale reforms are taking place and when reorganization has embraced not only the economy but all of public life, it is exceptionally important to regulate every step in the organization of any business, methods or style of operation.

A peculiarity of the current period is that, as M.S. Gorbachev emphasized, we will carry out the reorganization on the march, as it were, in the course of actively solving economic and social problems. Success will depend not only on the competence of cadres and their understanding of contemporary problems, but also on how they are able, in conditions of widespread democratization, to rest on the increased activity of people and their striving to participate in the management of industry.

Complacency is the enemy of progress. But we are fighting it halfheartedly. Restive people who do not reconcile themselves to backwardness and a routine, formal-bureaucratic attitude toward technical innovations do not always find support. This often leads to patent suppression of the new, and from time to time also to a desire to put onesself in the best light even by means of post-scripts and eyewash, by misrepresentation of the actual situation. As a rule it is not just one person participating in its falsification, but groups of people and whole collectives. Some consciously, and others out of incompetence. But in any case, in the end this is of great economic and moral detriment to the state and to society. Our common top-priority task is therefore to develop in every labor collective a correct, healthy social opinion and to create everywhere an atmosphere of decisive non-acceptance of everything negative and against the norms of socialist morals.

Party, trade union and komsomol organizations, NTO [Scientific-Technical Departments] and VOIR [All-Union Society of Inventors and Rationalizers] and economic

directors of all levels should direct all their organizational and political work toward mobilizing labor collectives of the branch to the solution of problems, put forward by the CPSU Central Committee, of radical reorganization of all work. They should conduct it persistently and purposefully, decisively eliminating all that impedes it and broadly using socialist competition, professional contests, exhibits and various forms of publicity--anything that will raise the prestige of creative labor and expose its inexhaustible opportunities.

According to the paper the debate spread.

Objectively evaluating the level of work and development of enterprises in the city of Bendery from a position of the demands of the day, first secretary of the party gorkom V.N. Voronin noted in his presentation that not one of the plants put on line in the past or scheduled to go on line this year has flexible production systems or robotized complexes and modules. Problems of complex mechanization are likewise not resolved. All this attests to the fact that many of the management cadres have still not realized fully the demands of the time, have not reorganized psychologically nor learned to work for the future. And as a result enterprises are put into conditions where it is difficult to carry on the fight for increased quality and competetiveness of production.

Attention to the burning issues of the day should not lead us away from those of the future, said the speaker. In this plan it would be good to pause on the work of the Moldavkabel and Elektroapparatura plants. Both belong to the USSR Minelektrotekhprom, but to different central boards. They also have different relationships with them. If at Moldavkabel all production problems are resolved with regard to the long term, there is no apparent progress at Elektroapparatura. Certain products are put out here under the technical conditions of the 1930's and 36 percent of the workers do manual labor. This is the only machine building enterprise in the city where no development is projected for the five-year plan.

All the machine building enterprises in Bendery are today experiencing a severe shortage of highly qualified cadres in mass professions and specialties. The fact that the average category of operations performed is higher than the average category of worker effects the quality of production. Many of the engineers that completed their educations ten or more years ago are literally afraid of the new equipment. The need cannot be put off to solve the problems of training and retraining cadres in all groups in conformity with the modern level of production.

Secretary of the partkom of the Beltsy Production Association imeni V.I. Lenin, V.P. Shenyagin continued this thought in his presentation. He said that the Ministry of Higher and Secondary Specialized Education and the republic's Gosprofobr must organize the professional training of young people for new, modern professions. And this must be done in good time, before the widespread implementation of computer technology and manipulators at enterprises. Short evening courses for the retraining of young workers should be set up under SPTU [Rural Professional-Technical Training Schools] and at enterprises. It is also advisable to think out a republic-scale system for cultivating skills in programming and working with computers for the management cadres at various levels.

V.N. Voronin and V.P. Shenyagin believe that the time has come to open branches of the Kishinev Polytechnical Institute in Bendery and Beltsy. The means for setting up the material base of such branches can be found in the proportional participation of interested enterprises in these cities.

The secretary of the Department of Physical-Technical and Mathematical Sciences of the Moldavian SSR Academy of Sciences, academic D.V. Gitsu, dwelt in his presentation on the problems of balanced development of fundamental studies in the republic and the implementation of their results in industry. He said that two interagency scientific-technical centers, Electrophysical Methods for Processing Materials and Electronics and Automated Systems, are being established on the basis of the facilities of the departments of physical-technical and mathematical sciences and the Minvuz faculties that encompass it, and a number of NPO and industrial enterprises. A most complete program of cooperation has been put together by the union Ministry of the Communications Equipment Industry, which devotes significant attention to this problem. Unfortunately, such initiative is absent at a number of republic ministries and departments.

Other speakers emphasized the participation of scientists in solving one of the most important national economic problems--increasing the reliability and longevity of machines and the corrosion resistance of mechanisms, particularly agricultural equipment. Various technologies have already been developed for applying strengthening and protective coatings and for restoration of parts for machines and tools. At the same time, these technologies are far too little used. The speaker proposed setting up model experimental-industrial sections within the Gosagroprom system, at which it would be possible efficiently to implement modern technological processes for hardening metal. The academic pointed out the difficulties of the large-scale use in the republic's economy of scientific developments in the area of the newest electronic apparatus because of the weak development of branch scientific-research institutes with a physics-technical orientation. They must be staffed and equipped. We have good opportunities for expanding the range of instrumentation products, many of which do not surpass world standards in terms of basic parameters. But without a fundamental reequipping of experimental production it is impossible to secure their competetiveness.

Unfortunately, the system of material-technical supply for basic studies and developments is at an extremely low level. Researchers are poorly equipped with new instruments and materials.

The director of the Kishinev plant Signal, Hero of Socialist Labor I.T. Bordyugov, noted that the party's course toward intensifying machine building makes it necessary to carry out technical retooling of enterprises with maximal economic efficiency. However, the foundations for efficient retooling of the branch are still lacking today, and it cannot be put off. This is why the modernization process should be strictly managed, economically well-founded and should take into consideration the opportunities of the supplier of equipment as well as the enterprise itself.

It is also advisable to concentrate effort and means on the mechanization and automation of such operations as installation-assembly, adjusting, control and testing operations, where 60 percent of the labor-intensive work now takes place.

There is still no special equipment for this, therefore we are developing our own basis for its manufacture and coordinating with related enterprises.

We see the reorganization of people's psychology, primarily that of engineers, as an important resource in accelerating scientific-technical progress in the near future. In order to operate reliably, it is impossible to permit the smallest carelessness or deviation from the technology. However, it is the carelessness of executors and their inadequate knowledge of the requirements of the gosts [State All-Union Standards] and of instructions that is a serious hindrance right now to the improvement of operations. Therefore the problem of increasing responsibility at all levels--from the worker to the director--and of activating the human factor and the social activity of everyone moves to the foreground.

Besides educational measures, also needed are rigid economic standards that will allow liquidation of wage leveling and the distribution of social welfare. We bring the production assignment to the brigades together with a fund of all types of material stimulation and a right to personal salaries for workers and pay increases for the engineering-technical staff. The criteria and a system for evaluating the contribution of every engineer have also been determined.

Basic and branch science, the speaker continued, is oriented today primarily toward the development of new products and undertakes little toward the development of high-efficiency technologies. Until such time as at least half the efforts and means of science are reoriented in a directional sequence toward solving the problems of technology, the goals set for us will not be achieved.

"The Moldavian PO Tochlitmash puts out two thirds of the machines for special casting methods that are produced in the country," reported the chief designer for the SKB of precision casting for this association, A.F. Kokoshko. "However, self-analysis has shown that the majority of them do not meet modern demands. For this reason we are starting to produce a new generation of equipment--rotor and rotor-conveyor lines. The association will produce the first lot of them next year."

But the rotor machines will require a new approach to their use. Hundreds of small, separate casting sections and shops will not be able to use them at full capacity. It is necessary to set up a regional association, to centralize casting production and to manufacture certain types of castings directly at metallurgical plants.

Establishment in the republic of an "idea bank" could serve to select the most efficient technologies in the casting industry and to eliminate parallel operations. One could go even further and make a "bank of machine building blanks", concentrating in it data on manufacturing technologies for cast, stamped, powder, sheet and other blanks. And an organization of the specialized association Tsentrozagotovka would allow all machine building, tool building and other enterprises to order and obtain from it these blanks, which maximally approximate ready parts.

The problem of cadres awaits a solution. Our SKB is now conducting studies in 30 directions with personnel numbering only a little over 100 people. This is clearly insufficient.

Separate branch NII [Scientific-Research Institutes], KB and vuzes are presently working on the problems of the casting industry. And a single coordinating center is needed--a scientific-industrial association that Tochlitmash could become.

"Solution of the problems we have discussed today depends on the presence of competent and inspired specialists," noted corresponding member of the Moldavian SSR Academy of Sciences, doctor of technical sciences, professor and chairman of a department at the Kishinev Polytechnical Institute, I.F. Klistorin. "However, the engineers of our republic are unfortunately not fully prepared to solve the problems of accelerating scientific-technical progress. And increasing the qualifications of cadres in this category has an episodic character. The existing system of retraining them during a break in production has become obsolete. Raising qualifications without a break from work drags on for a long time. According to the experience of other cities in the country, it can and must be shortened. Retraining of certain categories of specialists could be accomplished at our institute, where the most qualified technical professorial-instructor staff is concentrated."

The close interaction of vuzes and enterprises recommended itself for increasing the level of preparation of specialists. Positive experience in this plan has been accumulated by the polytechnical institute and the Signal, Moldavgidromash, Mezon and certain other plants. Such practice merits more widespread dissemination.

The presentation of the head of laboratories at the SKB of the Kishinev Tractor Plant production association, P.P. Nedranko, was isolated from the practical problems of today. Having restricted himself to general discourse, he said nothing about how the collective intends to achieve improvement in the quality of operations.

V.I. Smirnov, second secretary of the Communist Party of Moldavia Central Committee, summed up the results of the conference.

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MACHINE BUILDING STANDARDIZATION, QUALITY STRESSED AT EXHIBIT

Moscow MEKHANIZATSIYA I AVTOMATIZATSIYA PROIZVODSTVA in Russian No 6, Jun 86 pp 41-42

[Article by Ye. T. Larina under the heading "At the USSR All-Union Exhibit of National Economic Achievements": "Standardization -- Important Factor in Intensifying the National Economy"]

[Excerpts] The thematic displays which opened at USSR VDNKh (Exhibit of Economic Achievements) pavilions on the eve of the 27th CPSU Congress have acquainted visitors with a broad program for resolving the most important national economic tasks facing industry and agriculture.

The Standards Pavilion display (February of this year) in eight sections provided a convincing picture of the tremendous amount of work being done to create a precise state standardization system, telling of its organizational and scientific foundations and of the metrological service, fundamental factors in solving the problems of accelerating scientific-technical progress. Special note was made of the role of standardization in developing machine-building, in saving metal and fuel-energy resources, and in implementing the USSR Food Program.

In 1986-1990, the USSR State Standards Committee and the machine-building ministries are embarking on the development of a long-range standardization program whose implementation will permit a 1.5- to two-fold reduction in the labor-intensiveness of standardized items, a 10 to 15 percent reduction in metals-intensiveness and energy consumption, and a two- to five-fold improvement in reliability.

Extensive use of standardization principles in the 11th Five-Year Plan ensured full normative and dimensional compatibility of individual items in machine complexes and systems and created the basis for maximum use of the modular-unit principle of developing new equipment. All this enabled us to reduce the labor intensiveness of machinery manufacturing by 40 percent, materials intensiveness by 10-15 percent and energy consumption by 5-10 percent, as well as to reduce the products list and stock of spare parts by 20-30 percent. It is assumed that the economic impact of standardizing and specializing the production of parts and assembly units will be 96 billion rubles in the 11 machine-building branches in the 12th Five-Year Plan.

Machine-building specialization and consolidation on the basis of standardization in the 12th Five-Year Plan will provide an opportunity to increase labor productivity by 12 percent. Maximum product and product-component standardization using new equipment and technology have laid the foundation for current basic directions of continued interbranch production specialization and consolication broadening and deepening in machine-building. Actualization of these directions in the 12th Five-Year Plan will ensure a nine-percent reduction in machine-building and instrument-manufacturing output net cost in the 12th Five-Year Plan and up to a 70-80 percent increase in the proportion of progressive technological equipment in the overall products list.

Much attention was paid at the exhibit to the role of standardization in saving metal and using it efficiently. In the 11th Five-Year Plan, progressive materials-intensiveness indicators were introduced into more than 300 state standards, ensuring a significant savings of metal. Thus, the use of standardization methods in metallurgy permitted a savings of upwards of 2.5 million tons of rolled ferrous metals in the 11th Five-Year Plan. By 1985, fuel and energy expenditure normatives had been introduced into almost 400 GOST (All-Union State Standards) for power-generating and fuel- and energy-consuming equipment. A separate exhibit section was devoted to normative-technical support for implementation of the Food Program.

The problem of state product quality control and methods of solving this problem using standardization occupied an important place in the exhibit's displays. They presented the experience of a number of ministries, regions and enterprises in introducing, improving and developing product quality control systems.

As has been repeatedly emphasized in our party resolutions, machine-building plays the key role in implementing the scientific-technical revolution. In the 12th Five-Year Plan, the rates of increment in it are to be increased by 50 to 100 percent. Standardization has been given a significant role in implementation of this ambitious program.

The experience accumulated in the country in perfecting production organization and management has permitted setting up work on scientifically generalizing it and standardizing typical control elements. As a result, a complex of fundamental state standards for managing the production association and industrial enterprise has been developed. The first management system based on this GOST complex began operating in 1983 at the Sumi Machine-Building Plant imeni M.V. Frunze. The experience of this association in introducing a comprehensive production efficiency management system was presented at the exhibit. The association makes extensive use of normatives. Data were given on the effectiveness of the normative method.

One feature of this KS UKP [comprehensive production efficiency management system] is the use of maximum opportunity normatives in the mechanism for evaluating and stimulating enterprise activity. KS UKP arouses subdivision collectives to use all their reserve possibilities for meeting plan assignments and improving labor productivity.

The experiment in a systems approach to the problem of improving product quality and production efficiency is being mobilized to resolve the most important task

facing our industry, expanding the introduction of full-function control systems, foremost in branch planning-design and scientific-research organizations.

The exhibit display devoted to machine-building standardization emphasized one of the significant tasks in machine-building, establishing in normative-technical documents progressive machinery and equipment technical requirements corresponding to the highest engineering and technological achievements. Included in it was a model of the ASK-10 flexible manufacturing system (a portion of the Zhalgiris flexible manufacturing shop), which is designed for rough, finished and semifinished machining of gray iron housing parts in small-series production; for the first time in domestic practice, a highly automated system has been developed for transport storage, monitoring and diagnostics; all this will permit actualizing the principles of "unmanned" technology.

The exhibit elucidated the basic line in the 12th Five-Year Plan in the field of automated planning, which is standardizing program-methods complexes (PMK) for incorporation into SAPR with various functional designations. Their introduction ensures a 30-35 percent reduction in planning labor intensiveness and time. The exhibit also displayed a model of an IR820PMF4 machining center for high-productivity machining of small, complexly shaped parts; the cutting tool and parts being machined are replaced automatically. The machining center is equipped with a modern NPC system, and problems of collecting and removing shavings and completely cleaning off the machined part in the work zone of the machine tool are solved in an overall fashion.

Certification plays an important role in planning and stimulating work to raise the technical level and improve the quality of products. Output awarded the state Emblem of Quality must correspond to the highest world level in terms of technical-economic indicators. One mandatory requirement is that a quality category be awarded only on the basis of state product certification test results. Certification is a fundamentally new line of work on improving product quality and technical level, on ensuring product competitiveness in foreign markets. This is a system which confirms that the actual specifications of a product conform to the requirements of the standards. Our country has begun developing a national certification system.

Those at the exhibit could learn about product quality certification in the USSR Ministry of Ferrous Metallurgy system, where the proportion of output with the state Emblem of Quality (in terms of total production volume) was as follows for the basic types of metallurgical output in 1984: cast iron -- 31.4 percent, rolled metal -- 31.6 percent, pipe and tube -- 32.1 percent, wire and wire products -- 27.4 percent.

The USSR Ministry of Ferrous Metallurgy system numbers 32 enterprises supplying products with the state Emblem of Quality and representing more than 50 percent of all products certified.

Exhibit visitors were interested by the full-scale models displayed. One example would be the MF-31-KTs device used under laboratory and shop conditions in metallurgical machine-building and machine tool manufacturing branches of industry to monitor heat treatment and chemical-heat treatment of ferromagnetic steel and iron items.

The release of quality products is ensured by the use of a number of monitoring and measuring devices displayed at the exhibit. These include the Model K60-6 for monitoring tap rake, the Model K32-1 for monitoring the outside diameter heel clearance of inset cutters, the Model K33-4 for monitoring angles on the cylindrical surfaces of end milling cutters, the Model K33-5 for monitoring the rake and heel clearance of end milling cutters, and others.

The exhibit emphasized the importance of improving the methods and means of standardization, an effective lever for accelerating scientific-technical progress and an important tool in planned management of the national economy.

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MACHINE BUILDER ERRORS DELAY SLABBING WORK, UP COSTS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Sep 86 p 2

[Article by V. Alekseyev, head of the lubrication office at the Metallurgy Complex imeni Ilich in Zhdanov: "Ten Years and Still not Ready," and editors' comments at end of article]

[Text] Whatever you say about them, you can't deny that the slabbing shop workers at the Zhdanovsky Metallurgy Complex imeni Ilich have had a run of extreme bad luck. It started when the facility went on stream and has been with them ever since. This year marks the 25th birthday of slabbing at this complex which has not yet been able to get a flame conditioning machine working.

They have had two of the machines. The first was installed and started along with the mill, but it refused to obey the operator's commands. And the entire machine, which was designed to remove films, cracks, pits, blisters, and other billet surface defects by burning them off, never did a day's work. The eight years spent trying to get it to work here in vain; the design was obsolete and the parts could not handle the load required of them. In the end, they had to take it apart and sent it to be cut up for scrap.

The plant's workers continued conditioning slabs manually, trying the entire time to get a new, state-of-the-art machine. Finally they succeeded in obtaining one. The fruit of the collective labors of such organizations as the Chelyabinsk Scientific and Technological Institute of Metallurgy, the Magnitogorsk Proektavtomatika [Automatic Machinery Design] Institute, and the Zhdanovsky branch of the Ukrigipromez [Ukrainian State Union Institute for Planning Metallurgy Plants] Institute, the novel machine was delivered to Zhdanov from a Novokramatorsky Machine Building Plant association.

The new machine did not exactly get rounds of applause when it appeared on the scene, as a good ten years was spent installing it. But billets are still conditioned the same old way: manually. And the number of personnel retained is 20 over the designated figure. To be treated, slabs are taken off the line, cooled with water, and usually stored to permit them to cool enough for workers to approach. Then, before rolling, the conditioned billets are returned to the heating oven. All this is difficult, unproductive, and expensive.

When after considerable effort the machine was finally assembled and turned on, everyone just shrugged their shoulders in dismay: the machine just did not seem

to want to work. One after another, the reduction gear units broke down. The representative of the Kramatorsk association who was called determined that a serious mistake had been made when designing the machine; that is, that the machine's body, which should have been made of steel, was made of cast iron. And at least a dozen other design flaws and machine builder mistakes were discovered.

While dealing with these problems, experts from the Zhdanov complex visited the Ural area and Siberia, where similar facilities use the same equipment with no difficulties at all. And in Zhdanov, the friction continued between the metallurgy complex personnel and the machine's designers. The former were unable to insure that the oxygen for the machine was sufficiently clean, while the latter made new mistakes for every old one they managed to rectify.

The worst of the mistakes had to do with the hydraulic cyclone, which is used to remove small mechanical impurities from the process water. When it and the trestle for the electric travelling crane were built, none of the Ukrgipromeza specialists ever got around to telling the builders that if they did not put the crane at least a meter higher, natural backflow of the purified water would be impossible. The hydraulic cyclone was built; money, material, labor, and time were spent. Then a considerable amount of time was spent in building up the walls of the chamber, and the armature was changed. But the original problem still persists, and the cyclone is not working. So now, how do we get it up to the requisite height? They say that dozens of cubic meters of reinforced concrete will have to be knocked out, in-coming and out-going pipe junctions will have to be redone, and a host of other changes will have to be made.

Overhauling began in summer of last year but was never completed because construction personnel from the Zhdanovmetallurgstroi [Zhdanov Metallurgy Construction] trust did not wish to work on such an onerous task. Hence, the problems preventing the flame conditioning machine from operating at the complex were never solved. Yet 4.2 million rubles have already been put into it, and more money will most certainly follow.

The final score is not encouraging. Because of irresponsibility and wastefulness on the part of the machine's designers and the complex's managers, this powerful machine is operating at the absurdly low level of 20-25 percent.

[Editor's Comments] The editors request that D. Galkin, Ukrainian SSR minister of ferrous metallurgy, answer the following question: "When will the factors preventing normal operation of the flame metal conditioning machine at the complex imeni Ilich be dealt with?"

The editors request that E. Zvizhulev, deputy minister of light and transportation machine building, answer the following question: "Do the personnel from the Kramatorsk facility plan to ever have a machine that will work as it is supposed to?"

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DEPUTY MINISTER RESPONDS TO INNOVATION DELAYS ARTICLE

Moscow SOVETSKAYA ROSSIYA in Russian 3 Sep 86 p 3

[Article under the "'Dead Catch'" rubric: "Whose Arguments Have More Weight, After All?"]

[Text] The "Dead Catch" article reported, that for 11 years Minstankoprom [Ministry of Machine Tool and Tool Building Industry] had not examine a band saw catch, an invention by P. Solodovnikov, a Moscow worker. The editorial board has received a lot of comments, containing harsh criticism of bureaucratic procrastination. And the other day, an official response came in, that states:

"Having reviewed the "Dead Catch" article, published in the "Sovetskaya Rossiya" newspaper on May 9, 1986, Minstankoprom is pleased to provide the following information:

The "Dead Catch" article has been reviewed at Minstankoprom party committee and board meeting. For procrastination and absence of control during the examination of the band saw catch, designed by comrade Solodovnikov, former general manager of VPO [All-Union Production Association] "Soyuzdrevstankoprom" comrade Romanov was given a severe reprimand, chief engineer of Glavdrevstankoprom comrade Sigaylo received a reprimand, recorded in his [party] registration card, chief design engineer of Glavdrevstankoprom comrade Arpoldi received a severe reprimand, recorded in his [party] registration card.

The board imposed disciplinary penalties on director of Andropov machine tool building plant comrade Blatov and deputy director of VNIIDmash [All-Union Scientific Research Institute of Wood Processing Macnine Building] comrade Potyomkin (severe reprimands), chief engineer of Glavdrevstankoprom comrade Sigaylo and chief design engineer of Glavdrevstankoprom comrade Arpoldi (reprimands).

Between June 25 and June 30, interindustrial tests of the catch, designed by comrade Solodovnikov, and the serially manufactured catch were conducted in accordance with a test program, developed in consultation with the author.

Besides machine building professionals and the author of the clamp, occupational safety professionals from the All-Union Central Scientific Research Institute of Occupational Safety (VTsNIIOT); industry occupational safety department, Minlyesbumprom [Ministry of Timber, Pulp and Paper, and Wood Processing Industry]; technical inspector of the Central Committee of timber, pulp and paper, and wood processing industry labor union were enlisted to participate in the work of the interindustrial commission.

The commission has not recommended to use the catch, designed by comrade Solodovnikov, either in band saw woodworking machines or in wood processing industry the catch is designed for.

(Signed) **V. Skryabin**
Deputy Minister of Machine Tool and Tool Building Industry.

So, persons, guilty of eleven-years old red tape, have been severely punished. And it only took the Minstankoprom commission five days to quite unambiguously rule on the fate of the already patented invention. Not "should be reworked", not "should be improved", but simply "is not recommended" - and that is it. However, there are also other opinions, presented in letters, written by leading engineering professionals of enterprises, where the device, proposed by the inventor, has been already in operation for a long time.

A. Kochergin, chief engineer of Moscow plant "Universal":

"I am pleased to report, that comrade P.A. Solodovnikov's invention has been used at our plant since January, 1982. There have been 600 cases of band saw breakage, and each time the device operated in full compliance with occupational safety rules. Conclusion: Solodovnikov's catch works efficiently."

V. Smirnov, deputy chief engineer on occupational safety, **V. Seldyakov**, head of occupational safety department of a near-Moscow plant:

"Between October, 1977, and September, 1979, fitness for purpose of P.A. Solodovnikov's band saw catching device had been tested at our enterprise. The tests have demonstrated its high dependability and operational speed of response, simplicity, operational and service convenience for band saw operators. Application of these devices is of great national-economic importance, because it solves the problem of preventing occupational injuries, caused by band saw breakage. Conclusion: We recommend P.A. Solodovnikov's device for widespread implementation."

V. Glushkov, chief engineer of Tiraspol foundry machines plant imeni S.M. Kirov:

"We are pleased to report, that catchers, designed by P.A. Solodovnikov, are dependable in operation and are better devices, than those, that were previously installed."

V. Guskov, chief engineer, **A. Azamatov**, chief plant engineer of a Tyumen plant:

"Comrade P.A. Solodovnikov's invention has been used at our enterprise since June, 1981. Prior to that, machine tools were equipped with various types of catchers, but none of them eliminated cases of traumatism and created operational inconveniences.

During the operation of Solodovnikov's device, good results were obtained, as far as its fitness for purpose, dependability and servicing and maintenance simplicity. The catcher consists of a small number of parts, it is not difficult to make.

Conclusion: This invention has a great national-economic effect. We recommend this device for wider implementation."

Yu. Kirillov, chief engineer of Moscow machine building plant "Rassvyet":

"The device for catching a band saw, designed by P.A. Solodovnikov, has been in operation at our enterprise since July, 1981. Its operation is characterized by high dependability, meets cureent requirements to mechanisms of this type. Widespread application of P.A. Solodovnikov's device will make it possible to eliminate injuries, caused by band saw breakage."

From the editorial board: We could present a lot more findings of this type, much more, than there are signatures under the act of the Ministry appointed commission. There is no reason not to trust the Minstankoprom commission. But by the same token, one cannot ignore opinions of production professionals, opinions, based on long practical experience. So, whose arguments have more weight, after all? Unfortunately, Minstankoprom official response does not answer this important question of principle. Therefore, the editorial board cannot accept the response by Deputy Minister V. Skryabin as a comprehensive one.

12770
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BRIEFS

MACHINE BUILDING VITAL, NOT PERFORMING--The machine building industry is the source of the equipment needed by the economy to accelerate scientific and technological progress. Consequently, we have set ourselves the goal of effecting a dramatic transformation of this crucial branch of industry. To a great extent, implementing the measures we have planned depends on personnel in the construction industry. Yet for various reasons, there are delays in constructing new capacities and overhauling existing enterprises. In January, our newspaper wrote that work on the Voroshilovgradsky Crankshaft Plant was behind schedule. What happened was that Minselkhozmash [Ministry of Agricultural Equipment] failed to provide digitally controlled machine tools as it was supposed to, with the result that in 1985 capacities did not go on stream. Unfortunately, the situation at the site has not been any better this year. At the same time, several projects within the jurisdiction of Minstankoprom [Ministry of Machine Tool Building], the main machine building ministry, are behind schedule. And construction on the following facilities is proceeding at an unsatisfactory rate: the automated stamped sheet production line plant in Ruzaevka; the limited quantity production shop at Komsomolets, a Egorevsky machine tool plant; and the Nilolaevsky lubricating systems pilot production plant. [Excerpt] [Moscow STROITELNAYA GAZETA 24 Sep 86 p 1] 13189/12859

CSO: 1823/26

BRIEFS

ELECTRONIC DEVICE OUTPUT INCREASED--The Leningrad Scientific-Production Association Elektronmash collective has planned a four-fold increase in the output of highly precise electronic units with numerical control during the current five-year plan. The enterprise's product, which is called no less than the "brain filling" of modern machine tools, enjoys a deservedly good name among numerous customers. The new devices and instruments created here are not inferior to, and frequently surpass, similar world models. The quality and reliability of the complex devices are increasing. The collective has begun retooling production and actively introducing scientific achievements based on the evolving reorganization of work management and methods. Six scientific production complexes have been established in the association for this and a program-specific planning and control method has been introduced. /Excerpts/ /Moscow EKONOMICHESKAYA GAZETA in Russian No 38, Sep 86 p 1/ 8524

NUMERICALLY-CONTROLLED MACHINE TOOL EFFICIENCY--This is in response to the article "Based on a Complex Analysis" (No 26): Minzhivmash/Ministry of Machine Building for Animal Husbandry and Fodder Production/ has examined the questions raised in the article. We can report that the industry is carrying out organizational and technical measures to increase the effectiveness of using machine tools with numerical control. Structural subunits, which will provide the efficient operation of highly productive equipment, including machine tools with numerical control, have been created at the enterprises and organizations. Special attention is being paid to the group use of machine tools with numerical control and to an increase in their work shift coefficient. In the years 1986-1990 we foreseee the creation of 28 specialized sectors and an increase of the machine tool with numerical control inventory to 1,150 units and their work shift coefficient to 1.9. Measures have been taken to train and give refresher training to engineering and technical personnel and workers to maintain the highly productive equipment. To increase the loading and raise the work shift coefficient of advanced equipment, "Systematic Recommendations for the Payment of Bonuses to Workers of Integrated Processing Crews and Engineering and Technical Personnel Involved in Introducing and Mastering Machine Tools with Numerical Control and 'Machining-Center' Type Machine Tools" have been developed by the ministry and sent to the sector's enterprises. /By V. Klochkov, Secretary of the Minzhivmash Party Committee/ /Text/ /Moscow EKONOMICHESKAYA GAZETA IN Russian No 36, Sep 86 p 1/ 8524

CSO: 1823/28

NEW TECHNOLOGIES TO REDUCE METAL WASTE

Moscow TEKHNIKA I NAUKA in Russian No 1, Jan 86 pp 7-10

[Article under the rubric "Approaching the 27th CPSU Congress": "Reserves from Saving Metal"]

> [Excerpts] At the June conference in the CPSU Central Committee on accelerating scientific-technical progress, among highly efficient domestic developments modern-day forging machines machines were cited as permitting metal savings of almost 25 percent in comparison with machining, as well as labor reductions in the fabrication of components of up to 50 percent. Our correspondent, E. Novogrudskiy, met with the USSR deputy minister of the machine tool and tool building industry, Mr. N. I. Endovitskiy, and asked him to describe the role of this sector in the creation of progressive types of press-forging equipment capable of guaranteeing metal forming with little or no waste.

[Question] Nikolay Ivanovich, when speaking of Minstankoprom production, it has become customary to refer mainly to automatic lines, NC metal-cutting machine tools, machining centers, industrial robots. It is to a much lesser degree that we think of forging-pressing equipment, despite the fact that it permits progressive metal working and forming technologies which produce little or no waste.

[Answer] I would not go so far as to say that little attention is given to these types of equipment within the sector. During the final years of the 11th Five-Year Plan, we increased production of high-output forging-pressing equipment. For the 12th Five-Year Plan, even further increases are projected. Such equipment will vastly expand present capacity to take advantage of the potential offered by such advanced forms of plastic deformation as cold heading and extrusion, radial forging, ring rolling, precision cutting-off of rolled stock into blanks, closed hot die forming, cost-efficient examples of cutting and stamping blanks from sheet steel...

Implementation of these technological processes assumes particularly great significance now that mechanical engineering is seeing a growing application of automated lines and other means of automation, and now that development

and application of versatile production systems, "unmanned" systems, equipment which demands the use of blanks with minimal machining allowances, is proceeding apace. This is all predicated on development and creation of new types of presses, machines, systems as well as an increase in their output.

New generation machines and equipment are currently under development whose productivity will be 1.5 to 2 times greater than technology presently being turned out.

[Question] In this case, please discuss at least some of the more effective examples of equipment which can be considered indicative of future mechanical engineering enterprise equipment.

[Answer] Although a lot could be said on this subject, I will limit myself to just certain types of equipment.

We have created extremely promising types of program-controlled rotary swaging machines. They permit high-precision fabrication of smooth or graduated cylindrical products, and when necessary, tapered shapes as well. Their cross-sections may be solid or hollow. At the present time, these components are normally fabricated by cutting, with half or even more of the metal ending up in the form of chips. In addition, such processes tie up a large number of machine tools and operators. However, production of this type, in particular stepped shafts with minimal finish treatment allowances, and even without allowances, can be obtained with high precision by rotary swaging methods. There is virtually no metal loss and production is increased several fold. Each rotary swaging machine introduced frees at least 10 metal cutting machine tools. On the basis of this equipment, rearranged, automated, high-output bays are now under development.

Here is a one more example. In the mechanical engineering industry, particularly in enterprises specializing in short runs, there is great demand for large quantities of forgings in the form of graduated or smooth shafts, with an annular or rectangular profile and a mass of 50 to 500 kg. As a rule, fabrication of such items generally involves hammers, the operation of which entails strenuous physical labor. Generally in such instances, the resultant forgings have generous allowances for subsequent mechanical treatment.

An automated equipment system featuring program control has now been developed which is without parallel in world practice. It is based on precision free-forging performed by a hydraulic forging press capable of exerting 315 metric tons of force. This system also includes a manipulator capable of moving blanks weighing up to 630 kg as well as a fitting machine with tilter. The rotary worktable of the press features three positions. At the proper time, the mechanical arm of the manipulator installs into each the necessary tool which it takes from the six-position tool magazine. The table rotates to bring the tool into the work zone.

In this instance, everything is automated: the system is equipped with CNC and is controlled by two operators from their respective control panels. In this

way, manual labor is completely eliminated. The tolerance for component fabrication is under 1.5 mm. In other words, during finish treatment of such components only a negligible amount of metal goes to chip. There is also a 1.5-fold productivity increase over traditional hammers.

We also produce equipment for turning out metal blanks to custom specifications. Such equipment is based on crank shears with means for automation and mechanization. They are capable of cutting structural and tool steels while cold to a length tolerance of less than 1 mm.

To obtain flat products using the sheet-metal stamping method, highly efficient coordinate-turret machining centers have been developed. These are presently serving as a basis for development of flexible production modules and bays with program control.

What form would such an integrated bay system take? This machining center is designed for optimal sheet cutting, and fabrication of components of sufficiently complex configuration "in a single pass." It is designed around a 40 metric ton-force coordinate-turret press, shears for cutting off sheet metal, plus a sheet-metal bending machine. Each of these components is NC-equipped. This system also includes automated inter-operation handling, loading, unloading, component sorting and warehousing. The system is controlled by an automated technological processes and production control system. It will be used in the fabrication of a broad range of components, including frames, chassis, panels, etc. in both short and custom runs of multiple components. Currently, in the fabrication of this type product inefficient manual labor still prevails. And the resultant quality leaves much to be desired.

The system is undergoing final development at the Voronezh scientific and industrial association, ENIKmash, in the areas of forging-pressing equipment and modular production systems for mechanical working. Compared to conventional equipment, this system provides significant reductions in metal waste, while also ensuring a high level of productivity. This is due to optimal metal cutting. Major simplification results in the area of inventory planning.

[Question] And how much of this equipment is already in place? What has been the net effect?

[Answer] Production of most of the types of equipment mentioned has begun relatively recently. For this reason, not all of them have come into widespread use. However, during the 11th Five-Year Plan, the introduction of advanced types of forging-pressing equipment (about 10,000 units produced) has already enabled the industry to save in excess of 1.78 million metric tons of metal.

By way of example, an automated line based on a unique hot stamping crank press (12.5 metric tons of force) for stamping crankshafts and front axle beams for the ZIL-130 automobile has been developed by the Voronezh association for production of heavy mechanical presses, jointly with the association AvtoZIL. In the production of crankshafts alone there will be a savings of

3,500 metric tons of metal per year. On the whole, productivity will increase here 1.5-fold.

Let us come back to the system designed around a hydraulic forging-press (315 metric tons-force). Its use in the Kiev machine tool production association in place of gas-vapor forging hammers has brought about a 1.5-fold increase in productivity while the work force has been reduced by half. Rotary swaging machines are being used successfully in a number of enterprises, in particular in the association Elektrostal'tyazhmash at the Krasnoyarsk Auto Trailer Plant. Other examples could also be cited to document sufficiently effective utilization of modern forging-pressing equipment.

[Question] Everything you are saying sounds pretty upbeat. Does this mean that all problems have been solved, that the sector has an ongoing record of success in tackling the task at hand?

[Answer] Certainly not. There have been plenty of difficulties and problems. We have a vested interest in seeing to it that machine tool enterprises purchase our equipment and put it to heavy use. For this reason, our biggest job lies in not only boosting the output of modern forging-pressing equipment but also in ensuring that it represents a sophisticated level of technology while also ensuring maximum productivity, reliability and durability. Unfortunately, it does not always prove possible to attain the desired level. It must be conceded that certain of our plants have turned out poor-quality machines. Especially heavy criticism was drawn, for example, by presses from the Pinsk plant for automated forging-pressing lines. Serious problems were noted there with regard to organizational planning. We would like to assure readers that we are taking the most decisive measures to correct the situation.

There are a host of unresolved problems of an external nature. There are difficulties with cooperative deliveries, with the quality of component parts, particularly of hydraulic, electronic and electrical engineering parts. To put it bluntly, there are worries aplenty. A lot of things should improve as a result of efforts made toward specialization and concentration of forging-stamping production in nationwide quantities. We view this as an important step toward solving most of the problems pertaining to the level of sophistication and quality of machines produced.

[Question] Serious consideration is now being given to the overall role of science and, in particular, to the matter of stepping up production, increasing the level of technical sophistication of machines and equipment produced. How is science helping you?

[Answer] The machines and equipment which we have been discussing continue to be created with direct input from scholars and engineers from the scientific-research institutes of our branch and to a lesser degree from institutes of higher learning. Productively involved in this trend is the collective of our head institute ENIKmash, corresponding departments of the Moscow machine tool institute, the Moscow Advanced Technical School imeni N.E. Bauman, as well as several other schools of higher learning.

ENIKmash is developing an ideology of engineering improvement and is providing avenues for advanced engineering development. Its close ties to the design departments of enterprises and the systematic method of directing its activities have made possible everything we now have.

More and more, the achievements of fundamental science are being incorporated into examples of new technology. One of the most promising trends is exploitation of the superelasticity of metals. In this field, we are working in close cooperation with academic institutions, with the scientific-technical commission of the USSR State Committee on Science and Technology specializing in the problem of "superelasticity of materials," headed by a doctor of engineering sciences, G.B. Stroganov. The importance of the problem lies in the fact that deformation of metals while in a state of superelasticity makes it possible to stamp complex components using forces dozens of times less than those normally required, with the result that products of hard-to-deform low-elasticity materials are obtained with relative ease.

Definitive practical results have already been achieved. At the Dnepropetrovsk production association for production of heavy presses, an experimental batch of 4,000 metric tons-force presses has been completed for isothermic stamping which approximates stamping under conditions of superelasticity. Work has now begun on a double-action press with 1,250/1,250 metric tons-force which will be used especially for stamping metal while in a state of superelasticity.

However, if superelasticity permits a reduction in press force, and consequently the use of less powerful equipment as well, then we will have to explore avenues for making use of superelasticity in other applications. This should be done, for instance, in the synthesis of synthetic diamonds. In this instance, too, we are working in close cooperation with scientists, in particular with the Institute of high pressure physics imeni L. F. Vereshchagin. At the Ryazan' production association Tyazhpressmash full-scale production is already underway of hydraulic presses for those purposes. And presently, equipment is under development which indluces a 2,500 metric ton-force hydraulic press which will be used to produce diamond-hard alloy tips for drill bits.

In summary, it can be asserted that everything that is being accomplished towards creating new, advanced technology is the result of joint efforts by basic and specialized science, on the part of our scholars, engineers and innovative workers.

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IMPROVED QUALITY DOMESTIC MACHINE TOOLS, INNOVATIONS DISCUSSED

Vilnius SOVETSKAYA LITVA in Russian 23 Jul 86 p 4

[Article by R. Chesna, under the "Engineering and Technology Innovations" rubric: "Guarding Accuracy"]

[Text] Machine tool building enterprises in our country have declined services of a number of foreign companies. The Domestic industry has begun supplying these enterprises with complex and expensive measuring instruments, that they previously had to buy in England, France, Italy. For the most part, this equipment was developed at the Vilnius branch of ENIMS [Experimental Scientific Research Institute of Metal-Cutting Machine Tools] and its experimental plant "Pretsizika".

"Measurements have become a mass-scale technological operation nowadays", notes Candidate of Technical Sciences Algis Gapshis, director of the Vilnius branch of the institute. "They consume over 10% of social labor. It means, that each tenth person works with measuring devices".

"If you can measure it, you can make it", one can see this motto in the branch laboratories, where measuring instruments are born. Here, one handles quantities, that are even hard to imagine. The distance between hatches, those thin lines, that cover a 0.6 m long glass rule, can be only seen in a microscope. In order to see them with a naked eye, the rule should be one kilometer long... And a micrometer, the unit of measurement, used by professionals, will become more comprehensible, if one compares it to one-fortieth of a human hair thickness.

Scientists demonstrate high-precision transducers, developed by the branch, the instruments, measuring systems are based on. Some of them easily fit into a palm, others ae slightly bigger. When installed in CNC machine tools, they make it possible for production personnel to machine parts to several thousands of a millimeter and to eliminate rejects. Vilnius, Orsha and Moscow enterprises have started production of these measuring instruments.

Here is a new coordinate-measuring machine, the last in the series of machines, developed by the branch and "Pretsizika" plant design engineers.

button, and a special "arm" with sensitive fingers-needles smoothly slides over the machine surface. In a matter of seconds, a printer prints out hundreds of measurement parameters, indicating all deviations from standards. In order to accomplish what the machine did in less than an hour, a group of metrologists would need at least three days.

Such machines, that make it possible to automate measuring operations, will be first of all shipped to large industrial enterprises of the country. Orders have been received from the Volzhskiy automotive plant in Togliatti, "Rostselmash" [Rostov agricultural machine building plant], Moscow automotive plant imeni I.A. Likhachyov. There, these machines will be especially efficient, becuase each machine can increase productivity of measurements five-fold.

Shortening the path from an idea to implementation thereof, creators of new technology expand their connections with production collectives. Thus, together with Kaunas production machine tool building association imeni F. Dzerzhinskiy, a joint schedule has been compiled, that makes it possible to speed up mastering production of instrument transducers for indexing tables, whereas a program for development and measuring of flexible manufacturing systems is being implemented together with Vilnius machine tool building plant "Zhalgiris".

> However, there are still a lot of difficulties along the way. The problem of approving technical documentation for new machines and equipment has not been solved yet. Thus, the Institute design engineers had to call on various All-Union and republican organizations literally several hundred times, in order to get technical documentation for relatively simple machine tools approved, which is far from facilitating acceleration of scientific and technical progress.

12770
CSO: 1823/06

UZBEKISTAN'S KIBERNETIKA NPO LOOKS TOWARD FMS, ROBOTS

Tashkent EKONOMIKA I ZHIZN in Russian No 4, Apr 86 pp 43-46

[Article by Doctor of Economic Sciences N. Muminov, deputy general director of the Kibernetika NPO of Uzbekistan, under the heading "Branch Economic Problems": "Future Lies With Flexible Technologies"]

[Text] The unmanned shop or plant -- this is a concept just recently in the realm of fantasy. Now that the national economy is encountering such restrictions as the manpower shortage and lack of raw materials, the development of flexible manufacturing systems (FMS) and robotized equipment complexes (REC) has become an urgent command of the times.

The immediacy of this task is increasing for one other reason as well. We are now noting a trend towards increasing production of series and small-series items, and the rate of such increase is high. This pace can be met only by providing production with effective equipment capable of "flexible" adjustment to release a wide variety of items.

En Route To the Unmanned Shop

Flexible automation is achieved by providing technological equipment with numerical programmed control (NPC) systems. That means first of all NPC metal-cutting machine tools and NPC measuring machinery to automate the manufacture and measurement of items. The current level of automation of basic technological processes in machine-building is considerably higher than the level of automation of auxiliary and transport operations. Due to this, promising technological equipment is being serviced by an army of low-skill workers whose functions include loading and unloading blanks, changing tools, removing shavings, and so on.

As we can see, very little remains to be done to achieve full automation: replace the operator performing unskilled jobs with an automatic machine. The machine -- an industrial robot or mechanical arm with programmed control -- is designed to automatically reproduce the motor functions of the human hand in production processes.

The use of robots helps complete the process of automating auxiliary operations in series and small-series production and the subsequent creation of "unmanned"

plants. The use of robot equipment systems in mass production reduces the time needed to design, manufacture and introduce automatic flow lines. It becomes possible to readjust lines quickly to produce different modifications of items.

The Leningrad obkom has developed an interesting territorial-branch program for intensifying the economy in the 12th Five-Year Plan on the basis of accelerating scientific-technical progress. It is targeted at significantly increasing production efficiency by retooling and renovating existing enterprises, making better use of the available production and scientific-technical potential, comprehensive mechanization and automation, and the extensive use of new equipment and progressive technological processes.

Leningraders are now working out a unified general city and oblast development plan for the next 20 years. They have already begun implementing the "Intensification-90" territorial-branch program. Industrial production volume is to be doubled in the next two decades, with outstripping growth in labor productivity.

Production renovation and retooling are the cheapest ways of ensuring good end results, and delaying this work over many years is impermissible.

Scientific-technical progress is emerging as the basis of economic intensification. In 1985, industrial robot production in our country increased significantly, and more computer complexes and automated design systems employing microprocessor equipment were used. The production of flexible manufacturing systems and modules was anticipated for the first time. All this testifies to substantial advancement along the most important lines of technical progress.

New demands are now being made on machine-building development by the fact that machinery and system interchangeability has been accelerated substantially. They are characterized by high equipment productivity and opportunities for rapid readjustment to manufacture new items.

Extensive use is being made of microprocessors and micro-computers to control machine tools and units, complex robots and transport systems. The actuating mechanisms can therefore be easily restructured to manufacture new types of items. Numerous computers can be combined into one system without much effort, forming a computer complex which can be used to automate complex multistaged production processes. These systems have different names in different countries. In our country, they are called flexible automated production facilities (GAP [flexible manufacturing systems (FMS) in the US]).

It would seem to be unrealistic to orient ourselves solely towards flexible systems when retooling production. One cannot change over from manual labor to the world of continuous automation right away. We need to systematically saturate production with mechanization devices and programmed machine tools, using them as a basis for computer-controlled flexible modules and sectors.

The task facing Uzbekistan industry, of intensifying production, automating technological processes, and increasing the productivity of manufacturing enterprises, predetermines the appropriateness of developing a program for the extensive introduction of flexible manufacturing systems and robot equipment complexes.

The Kibernetika scientific-production association of the Uzbek SSR Academy of Sciences is the lead organization for coordinating this work. It has created an initiative group to conduct fundamental and applied research in the field of robot engineering. The research results are to be introduced at republic enterprises in the 12th Five-Year Plan.

Robots Being Put Into Service

The Uzbek Kibernetika NPO is developing tactile devices for robot actuating mechanisms and the hardware and software for analyzing and recognizing images. Mobile and remote-control RTK, parts-manipulation devices to be incorporated into automatic loading-unloading systems, and adaptive robot control systems are being researched.

Prototype development is in the final stage in each area, in particular, sensing parts gripper models, the basic components for inputting video images into computers, technical vision system software, mobile robot models and part feeding devices

The Mikond plant began development of robot equipment complexes and a flexible manufacturing system in 1983.

A special planning-design bureau at the Uzbek Kibernetika NOP concluded an agreement with the republic Ministry of Local Industry in 1985 to conduct design studies on automating technological processes at a plant producing kitchen and other furniture.

Republic ministries, departments, associations and enterprises continue to introduce automatic programmed-control manipulators and electroplating transfer arms, balanced manipulators for loading-unloading work, and other robot equipment which increased productivity and reduces the proportion of manual and monotonous labor.

The Samarkand Elevator Plant, the Elektrodvigatel Plant in Andizhan, and the Signal and Tekhnolog associations are most active in this field.

The Samarkand Elevator Plant's introduction of three robot equipment complexes saves 71,000 rubles annually. Four people have been relieved of monotonous labor.

The Signal association has introduced an RTK for chemically treating printing plates; it is comprised of 22 automatic manipulators, all of which were developed by association designers. This complex has improved labor productivity four-fold as compared with the technology previously used.

The Tekhnolog association is using special unitized machine tools to produce robotized lines with flexible links for republic agricultural machine-building enterprises.

The Kibernetika NPO is Uzbekistan's main organization for coordinating the introduction of robot equipment, performing economic-agreement work with the

participation of technical services of such clients as the republic Ministry of Local Industry, Tashkent Excavator Plant, Tashselmash (Tashkent agricultural machine-building), and others.

The development of flexible manufacturing systems is expensive. Special models are therefore developed to automate particular technological processes. It has become necessary to seek out new methods of optimizing simulation models which can be used if it is impossible to conduct an actual experiment.

The Kibernetika NPO of Uzbekistan has developed technology for optimizing gang adjustments, as well as an FMS simulation model which permits determining the actuating sequence for lots of parts, selecting optimum materials flows, and evaluating such technical-economic indicators as actuating mechanism load factor, unfinished production, adjusted expenditures, and so on. The optimization of FMS layouts is now being studied on an economic-agreement basis using imitation simulation at a Moscow enterprise.

Some of the association's scientific-technical developments have already been introduced into production. In particular, the Tashkent Tractor Plant production association installed five robot equipment complexes during the 11th Five-Year Plan. These included an RTK for machining small housing parts, a line for machining aluminum cover plates, a line for machining and turning shafts, and a line for machining all the keyways and grooves in the shafts.

These lines were combined into a single sector representing an independent structural production unit oriented towards producing eight different items. The sector manufactures 71,000 rubles worth of output a month.

[caption to photo not reproduced for this report:] Tashkent Tractor Plant association. Line for unit-machining shafts. Consists of a centering milling machine, two lathes and two special machine tools, as well as three robots. As at every advanced enterprise, the exemplary orderliness and cleanness of the workplace is striking. Photo by A. Zhdanov.

In a word, much of our work is already taking on visible features. Still, the production robotization and automation program for the 11th Five-Year Plan was not carried out in Uzbekistan. Even now that scientists and designers face new tasks, such as the development of flexible manufacturing systems, past mistakes must be taken into account.

Bringing Tomorrow Closer

When developing an FMS design, one needs to determine the most efficient way of organizing the whole production unit: sector specialization, choice of control system and computer, creation of unified transport-storage unit flows, and so forth. This approach is based on the modular principle of sector development, transport flows and equipment subassemblies, ensuring that the capacities of the automated robotized production facility will go on stream in stages.

In order to create FMS, each branch needs to choose base enterprises and draw up a long-range plan for developing them. Based on the experience of the leading enterprises, one needs to begin with developing the project at the level of

the plant or shop as a whole and to introduce it in stages, by module, line and sector.

Before embarking on the development of flexible manufacturing systems, the base enterprise must determine the equipment to be incorporated. Is a great deal of it computer-controlled, and in particular, is it NPC machine tools.

After determining the equipment composition, attention must be focused on selecting one of the mainprogrammable multifunction robot components. The development of such robots alone enables one to change over from automating individual operations to comprehensive automation of the production process.

Under these conditions, automated transport-storage systems providing production process continuity over two and three shifts assume fundamentally new importance.

It is appropriate to set up lead sectors at base enterprises. This enables one to test the technical resolutions involved in developing individual FMS components and to determine the interaction of the entire system under concrete production conditions.

The lead organizations must provide the base enterprises with technical assistance and must create standard, maximally unitized plans for all types of production. Organizing the centralized release of standard FMS module components will be the basis for their rapid introduction at all branch enterprises.

In order to resolve the indicated tasks, we need to:

broaden the work program for developing fully automated production facilities;

introduce standard FMS modules;

refine normative-technical materials;

develop mathematical models of production processes;

creative facilities to produce standard general-application equipment elements (cutting tools, high-torque a.c. motors and frequency convertors for them, inductance transducers, position adaptation devices, and so on);

develop microprocessor-based automated control devices and the technological and functional software and programs for them;

introduce automated design systems for developing not only apparatus components, but also technological processes, as well as equipment control programs.

A program of comprehensive automation based on the extensive use of electronic computer equipment must include not only production processes, but also engineering labor. Experience deminstrates that the use of computers in planning technological processes reduces expenditures of engineering labor 20- to 25-fold. For example, whereas the traditional method of designing a process for machining housings consisting of 18 steps and 80 operations takes 76 hours, only 3.6 hours are needed using the Ekran automated workstation.

It would be appropriate to create a lead institution for robotized complexes and flexible manufacturing systems to provide scientific-methods direction and coordination of all FMS development and introduction in the republic; it would

consist of a scientific-research institute, a design bureau and a pilot plant to manufacture and test prototypes and series models of RTK and FMS components. This institution would permit implementation of a unified technical policy and the effective resolution of many scientific-technical and production problems.

Based on the experience of the Leningrad obkom and the Moscow gorkom, we need to set up a coordination council for developing and mastering the production of robotized complexes and flexible manufacturing systems.

The coordination council would be subordinated to republic directive agencies. In Uzbekistan, we need to specify which will be the base enterprises for full mechanization and automation. It is important to organize specialized or basic-research laboratories at the enterprises, planning-design bureaus, branch institutes and affiliates to conduct expert research, reveal promising targets for RTK and FMS, and diagnose workstations.

It is also important to increase the training of specialists in robotized production technology by the mechanics department at Tashkent Polytechnical Institute. Increasing our training of specialists in trouble-shooting, installing, testing and operating RTK and FMS is another reserve.

We also need to organize a "Robot Engineering and Control Systems" or "Machine Science and Robot Engineering" scientific research institute as part of the Kibernetika NPO of Uzbekistan in the 12th Five-Year Plan. And we need to create a design bureau and pilot plant based on existing laboratories and departments, making it solely responsible for implementing the strategy of comprehensively mechanizing and automating republic industrial enterprises. Implementation of this program will become the basis for the widespread introduction of robots and flexible manufacturing systems into the Uzbekistan national economy.

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NEW PLANT TO PRODUCE STANDARDIZED MACHINING CONTROL UNITS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 23 Sep 86 p 1

[TASS article from Leningrad: "The Firm's First Products"]

[Text] The just-formed Leningrad Instrument Association imeni S. P. Voskov is oriented toward expanding the output of electronic control devices for automated metal-cutting equipment. Yesterday, the first lot of products with the brand name of the new firm were shipped to machine builders in Moscow, Leningrad and Ivanovo.

They are sensors for verifying the operating mode of machine-tool modules, "machining centers" and mechanized lines. The devices ensure a stable rhythm for the process conveyor, reacting to even micron deviations from the required metal cutting precision.

"The increase in the output of especially sensitive measuring instruments was caused by growth in the production of new-generation machine tools that are defining progress in many sectors of industry," said association General Director Ye. Solovyev. "The creation of a unified firm from scattered plants opens up the possibility of supplying products in complete kits. For example, kits for units of various types will include a cutting tool and measuring devices equipped with microprocessors. The combination of the efforts of specialists within the framework of a single enterprise will aid in reducing the cycle for the creation of new products."

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TECHNOLOGY PLANNING AND MANAGEMENT AUTOMATION

UNDERUTILIZATION OF FMS, FAULTY PLANNING, SUPPLY NOTED

Moscow EKONOMICHESKAYA GAZETA in Russian No 40, Oct 86 p 18

[Article by M. Panova, Vologda, under the rubric "Modern Equipment--A Full Load": "Millions at Half Speed"]

> [Text] On the first shift on August 29 in the press-forging shop of State Bearing Plant 23 [GPZ-23], only two presses were operating, while ten stood idle. There is no metal... The reason is the chronic imbalance of the production plan with material and technical supply.

After all, it is unique automated equipment controlled by electronics that is standing idle. Not one ball-bearing plant in the country has such modern forging equipment. The first phase with a production capacity of 32,000 tons of die forgings a year has become operative, but it frequently stands idle.

"The shop is very pretty when it is working, but now it's a dead shop," said its chief, Vyacheslav Gavrilovich Boykov, with chagrin and exasperation. "We completely fulfilled the plan only two months this year--in January and February. In March we were only able to put out 80 percent, in April--70, in May 50, in June 60 and in July and August--70 percent of the plan.

"Some 402 people work in our shop. As a rule, the jobs are entrusted to specialists with secondary and higher education--such is the technical level of the equipment. When the equipment is idle, we send the specialists to work at the bread or meat combines, where they are unskilled laborers. And what way is that to use highly skilled personnel, that are hard enough to pick up, and somehow keep at quite a high wage? When we get metal, a real madhouse starts here, overtime. Quality suffers, of course. For normal shop operation, we need about three thousand tons of hot-rolled metal a month, but so far they have been unable to meet fully our requirement. And notwithstanding this, another automated line is being installed, the cost of which is about 1.5 million rubles, and a second phase of the shop will be introduced over the five-year plan..."

Legitimate alarm. How can such a situation occur? Taking into account the stressed situation with the suppliers of hot-rolled metal, would it not be

better to direct more funds not toward new construction, but for the technical retooling of the plant, whose first types of production were introduced at the beginning of the 1970s, or to seek other opportunities of managerial maneuvering? After all, with the introduction of the second phase, the overall capacity of the shop will reach 60,000 tons of die forgings a year.

Plant Deputy Director for Supply Sergey Sergeyevich Zagorodnyuk feels that the plant is systematically ailing due to the irregularity of forge work as a result of the "triumph" of the notorious principle of planning "from what was achieved." It must be taken into account that the partners of GPZ-23 in economic contacts suffer as well, and a considerable portion of the die forgings of the plant go to GPZ-28 in Lutsk.

In composing the plans for material and technical supply, they stubbornly want not to take into account that the plant is still being built, that earlier part of the balls and wheel blanks for the bearings were obtained on the side, while now they refuse such supplies and provide for themselves. This means that they should receive both more high-quality cold-drawn steel bearings for the manufacture of balls and more hot-rolled metal for rings, including for the die forgings of the forging shop. In 1984 the plant received about 258 tons of ball blanks on the side, and 120 tons in 1985.

And so, we present a table composed according to the data of the calculations of Sergey Sergeyevich Zagorodnyuk.

Metal Requirements and Stocks

	1984	1985	1986
Bearing output plan, millions of pieces	85.1	88.3	91.0
Cold-drawn steel, tons required	4828	5015	5169
Cold-drawn steel, stock allocations	4010	4040	4000
Hot-rolled metal, tons required	9027	9306	10984
Hot-rolled metal, stock allocations	8249	9123	9450

As we see, the production plan is growing while the stocks for the production program (without taking into account cooperative obligations) are allocated not on the basis of requirements, but on the level achieved. As a result, the plant violates the planned supply of ball bearings and the cooperative supplies of die forgings. To the detriment of the consumers, bearings that require less metal for production are manufactured in place of large-sized ones. Over the first half of the year, for example, the delivery plan was fulfilled by 98.3 percent.

The need for supply discipline will increase in the future. It will be essential to provide for its 100-percent fulfillment, and not 97 percent, as today's preferential terms permit.

Plant specialists quite justifiably assume that on a sectorial scale, material resources must be distributed taking into account first and foremost the necessity of fully utilizing modern equipment. Highly efficient equipment

should operate at full force--this requirement of the 27th Party Congress, made specific by the June Plenum of the CPSU Central Committee, is important to take into account not only in resolving shift-coefficient issues within the framework of a single enterprise, but also in determining the utilization level of productive capacity at the newest enterprises, shops, types of production or specific facilities in a sector. Until now, the productive capacity of the modern forging shops is 50-60-percent utilized.

Now on ways of managerial maneuvering. The opinion of the plant workers is such that possibilities could be found here to ease the exceedingly strained situation with the metal suppliers.

Plant Chief Engineer Vyacheslav Viktorovich Usachev: "Our specialists were the first in the sector to propose that part of the die forgings manufactured in the press-forging shop be sent without lathe work to cold rolling for the manufacture of rings. Without going into the technological nuances of the new method, I will say only that the economy of metal in the manufacture of bearing rings totals 12-15 percent. We save, as a result, 30-40 grams of metal per ring. But these opportunities for economizing are not fully utilized, insofar as the press-forging shop is only utilized to half of capacity."

Another virtue of the method proposed by the plant employees is that it makes it possible to manufacture part of the ring not from pipes in other shops at the plant, but in the forging shop out of rolled metal.

The need for pipe is consequently declining, but its production, as is well known, is extremely labor-intensive and the utilization factor of the metal is poor.

Plant Deputy Director for Supply Sergey Sergeyevich Zagorodnyuk: "In basing the plan for 1987 we envisaged an increase in the production of bearing blanks from hot-rolled metal in the press-forging shop in place of utilizing the pipe process in other shops in the volume of 5,000 tons. We correspondingly requested a decrease in the amount of pipe. Deliveries of it to us have been reduced, but we haven't gotten the hot-rolled metal."

Press-forging shop Chief Vyacheslav Gavrilovich Boykov: "In order to supply metal for our presses, we are collecting waste products not only in the forging shop, but all over the plant. We devised an attachment to prepare them for production better. But waste products could be employed considerably better in the production of our products. Don't ship, for example, chips and trimmings to Donetsk per the purchase order of Vtorchermet, but rather send them for re-smelting to Cherepovets, manufacturing the chrome-plated ball-bearing steel we need at once. Through waste products alone, it would be possible to satisfy the needs of our forging shop for rolled metal almost completely. Preliminary preparation is needed for this, it is true, along with cleaning them of emulsions. But the expenditures for this are much less than those connected with the shipment of waste products to Donetsk and the idle time of our shops.

Another idea was expressed. The plant receives metal from Chelyabinsk, Ustinov, Serov and Cherepovets. If the Cherepovets Metallurgical Combine were to play a decisive role in supply, the plant workers would undoubtedly, in conjunction with the combine employees, find opportunities both to improve the regularity of supply and to propose new technical solutions that conserve metal. The ties between them are solid, and they know not only the days, but the hours when rolled metal is made at the combine that is coming to GPZ-23.

Solutions with initiative from the planning and management organs are needed for the full utilization of the capacity of the press-forging shop. There are still no such solutions. The photograph of the empty metal warehouse of the plant's press-forging shop was taken on March 31 of this year. At the end of August we found the same picture, and therefore decided to use the old photo. An empty warehouse, the press lines frozen, and two machine rooms filled with electrical equipment serving two presses in all.

And the loss here is not just economic, but moral as well. Plant Party Committee Deputy Secretary Tatyana Ivanovna Zykova spoke well about this: "It is difficult to call upon the plant employees to make maximum use of the achievements of scientific and technical progress and to strive for the highest return on equipment if we always have the example of the press-forging shop before our eyes. Today, when a rebuilding is developing in all walks of life, it is important that words not be at odds with deeds..."

It would be interesting to know the evaluation of the extant situation on the part of the specialists of the Ministry of the Automotive Industry, Gosplan and Gossnab. How do they regard the expansion of productive capacity in the press-forging shop through new construction, when the existing lines cannot be fully utilized? What way out of the situation do they see? The cost of fixed capital working at half speed is quite striking.

Here is the information supplied by plant accounting. As of August 1, the fixed productive capital of the press-forging shop totaled: 20,454,648 rubles and 34 kopecks.

If it is so, precise to the kopeck, then all of the managers and specialists responsible for the creation of the most modern shop and its supply of metal can figure the return on the funds invested in it...

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